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Review of the Pleasant Lake/Mattawamkeag Lake Wind Power Project Intercepts  
by Dr. James F. Palmer, December 2, 2011 ("Palmer Intercept Review")



**Review of the  
Pleasant Lake/Mattawamkeag Lake  
Wind Power Project Intercepts**

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## 1. Introduction

Terrence J. DeWan & Associates retained Market Decisions to conduct intercept interviews with users of Pleasant and Mattawamkeag Lakes concerning the potential effect of the Oakfield Wind Project on their recreation use and experience. Market Decisions conducted 60 interviews over two late summer weekends and submitted their report in October 2011 (Robertson and MacBride 2011).

This review considers the appropriateness and adequacy of the methods used to conduct the survey, and whether the survey data can be effectively applied to the evaluation criteria specified by the Wind Energy Act. It also incorporates an independent analysis of the survey data.

### 1.1 Wind Energy Act

Maine's Wind Energy Act<sup>1</sup> (WEA) established a new set of procedures for evaluating the scenic impacts of grid-scale wind energy projects proposed within an area designated for expedited permitting. These new changes include the acknowledgement that grid-scale wind projects will be highly visible, that the scenic impact of turbines is insignificant beyond 8 miles, and that associated facilities (i.e., not generating facilities) may be subject to the traditional regulations governing scenic impacts. The WEA also established that only the impacts to scenic resources of state or national significance (SRSNS) need be considered. These SRSNSs are clearly defined and the public must have a legal right of access to them. Finally, the WEA establishes the evaluation criteria that are to be used to determine whether the scenic impact is unreasonably adverse or not. Several of these criteria concern users of SRSNS:

- C. The expectations of the typical viewer;
- E. The extent, nature and duration of potentially affected public uses of the scenic resource of state or national significance and the potential effect of the generating facilities' presence on the public's continued use and enjoyment of the scenic resource of state or national significance; and

A third criterion also can also be interpreted as being based in the perception of users of SRSNSs.

- F. The scope and scale of the potential effect of views of the generating facilities on the scenic resource of state or national significance, including but not limited to issues related to the number and extent of turbines visible from the scenic resource of state or national significance, the distance from the scenic resource of state or national significance and the effect of prominent features of the development on the landscape.

These can be simplified into five distinct criteria that the survey must address:

1. Change in the scenic value of views from a SRSNS
2. Extent, nature and duration of use at a SRSNS
3. Expectations of a typical viewer from a SRSNS
4. Effect on enjoyment of a SRSNS user
5. Continued use of a SRSNS

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<sup>1</sup> MRSA Title 35-A, Chapter 34-A

## 2. Methods

### 2.1 Intercept Survey

The only SRSNSs within 8 miles of the Oakfield Wind Project that have a significant potential for views of the project are Pleasant Lake and Mattawamkeag Lake. Both lakes have public boat launches, though it was not anticipated that either lake was heavily used. Market Decisions decided to conduct intercept studies at each boat launch over two weekends: August 26 to 29 and September 2 to 5, 2011.<sup>2</sup> A total of 271 adults and children were observed at the boat launches, in addition to people on the lakes using 81 boats, 19 canoes or kayaks, and 5 jet skis. The interviews were completed before Labor Day, which is normally considered the end of the summer season. Forty interviews were completed at Pleasant Lake and 20 at Mattawamkeag Lake.

The methods used appear to follow standard best practice for recreation surveys at areas with low use. In order to maximize the number of people encountered, the interviewers located themselves at the primary public access point to the SRSNS (i.e., the boat launches). This approach seems less intrusive to the user experience and logistically more manageable than trying to conduct the interviews from boats on the water. The interviewers were instructed to invite every adult to participate in the study. Not all of the 271 people observed were eligible to be interviewed—youths were excluded for ethical and legal reasons. The interviewers estimated that perhaps 20 percent of the people observed were youths. The estimated response rate for the intercept studies is shown in Table 1; the overall response rate is 27.7 percent, which is respectable in a situation where there is only one opportunity to approach respondents, and some members of a party may be unwilling to wait while another member completes the survey.<sup>3</sup>

**Table 1. Estimated Response Rate for the Intercept Survey**

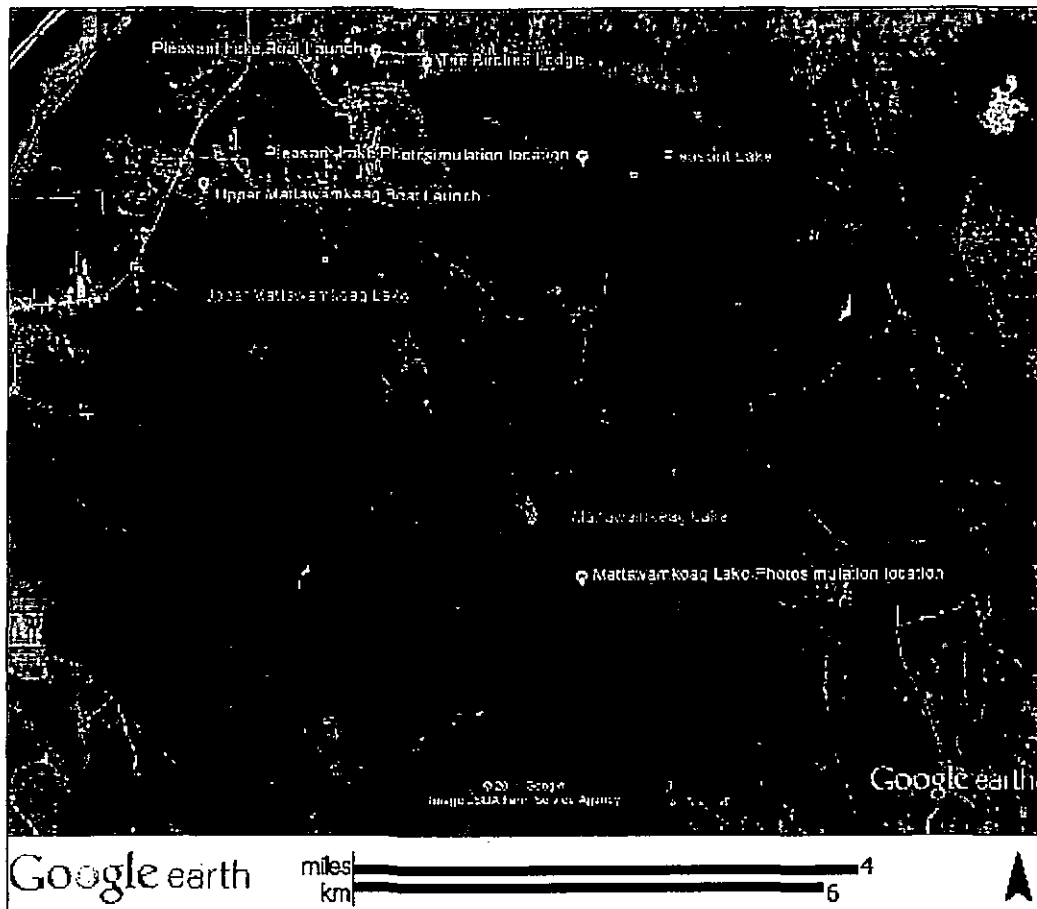
	Pleasant Lake	Mattawamkeag Lake
<b>Observed people</b>	176	95
<b>Adults (80% of observed)</b>	141	76
<b>Completed interviews</b>	40	20
<b>Response rate (%)</b>	28.4	26.3

The survey questions were tailored to address the WEA evaluation criteria. In particular, improvements were made in the questions about the nature of user activities and their expectations. The scenic quality of the two photosimulation viewpoints as they currently look and as they will look if the project is constructed was evaluated by all respondents. Since these viewpoints were not where the interviews were conducted (the project will have little or no visibility from the boat launches), it was not possible to test the validity of whether the evaluation of the actual view is similar to the photograph. However, previous intercept surveys

<sup>2</sup> Both weekends are from noon Friday through noon Monday. However no people were observed at the boat launches before noon on either Monday.

<sup>3</sup> The interviewer records the responses; the questionnaire is not filled out by a respondent. While this limits the number of respondents that can be accommodated at one time, it assures a higher level of consistency and integrity for the data that are collected.

conducted to satisfy the requirements of the WEA have shown that photographs are generally valid surrogates for evaluating scenic quality. Figure 1 shows the location of the boat launches where the intercept surveys were conducted and the two photosimulation viewpoints.



**Figure 1. The location of the boat launches where the intercept surveys were conducted and the two photosimulation viewpoints.** (source: Terrence J. DeWan & Associates)

## 2.2 Photosimulations

The photosimulations were selected to represent the “worst case” situation for each lake. The Pleasant Lake photosimulation is a panoramic view. The respondents evaluated a 30.5-by-10.75 inch color print. They were instructed to view it from 24 inches away in order to replicate the sense of scale of the actual view. Approximately 25 turbines are visible in the photosimulation, with the closest visible being 2.2 miles and the furthest being 5.2 distant. The Mattawamkeag Lake photosimulation was 27.5-by-10.75 inches. It shows at least 31 visible turbines with the closest at 4.4 miles and the furthest at 8.3 miles from the viewer.

## 2.3 Rating Reliability

It has often been claimed that “beauty is in the eye of the beholder,” the implication being that people have different scenic sensibilities. The reliability coefficient is the statistical parameter

used to measure the similarity of judgments made by different people of the same landscape views. The interclass correlation coefficient (ICC) is commonly recognized as the best estimate of rating reliability (Palmer 2000, Palmer and Hoffman 2001). The ICC is used in the review to establish the reliability of respondents' scenic value judgments, and their assessments of how the proposed project would affect their continued use of these lakes for five recreation activities.

#### 2.4 Simulation Validity

Representational validity concerns the accuracy of the photosimulation. The accuracy of the Pleasant Lake simulation was evaluated previously by Palmer (2011) and found to be acceptable. The Mattawamkeag Lake simulation was not originally included in the visual impact assessment prepared by T. J. DeWan and Associates (2011). They prepared a new simulation that better represented the "worst case" scenic impact viewing situation, as suggested in Palmer's (2011, page 23) review. Though not rigorously evaluated, it appears to be an accurate representation.

Another criterion to establish the validity of simulations is whether they elicit the same target response that is given the actual view. In the intercept survey, the target response is scenic value. However, the survey was conducted at the Pleasant Lake and Mattawamkeag Lake boat launches, while the photosimulation viewpoints were in the middle of each lake. Consequently, there was no opportunity to test whether the existing photographs were valid representations for evaluating scenic value. However, statistical reviews have found that color photographs are normally valid for this purpose (Palmer and Hoffman 2001, Stamps 2010).

#### 2.5 Measuring Scenic Impact

Scenic impact is the difference between judgments of the scenic value of a view with the proposed project and without it. However, the significance of this difference is dependent on the size of the rating scale used. For instance, a scenic impact of -1.0 using a 5-point scale is only half as significant if a 10-point scale is used. What is needed is a measure of scenic impact that is independent of the scale that is used. The two measures used in this review are percent change and effect size.

**Percent change.** Each of us is generally familiar with expressing change as a percent of the original or existing condition. It is a simple matter to apply this concept to scenic value ratings. The difficulty comes in interpreting the degree of significance associated with particular thresholds of change.

**Effect size.** The difference between the mean scenic value of a view with the proposed project and the mean without it, divided by the standard deviation is the effect size.<sup>4</sup> This is now the preferred method for characterizing the significance of differences in social sciences (APA 2010, page 33). Cohen (1988) suggested thresholds for interpreting the significance of a mean difference: a size effect of 0.2 is small, 0.5 is a medium effect, and 0.8 is a large effect. These thresholds have been found useful across a wide range of disciplines. Stamps (2000) has presented a powerful argument for using size effect to establish the importance of visual impacts. He reviewed "275 relevant studies, covering over 12,000 stimuli and more than 41,000

<sup>4</sup> Hedges g is used to estimate the effect size because the population parameters are unknown and the standard deviation is more appropriate for use with smaller sample sizes. (Hedges, Larry V. and Ingram Olkin 1985, pages 78-79).

respondents” (Stamps 2000, page xi). Based on his findings, he has characterized effect sizes below 0.2 as being trivial or unnoticeable, at 0.2 there is a noticeable effect where the difference between better and worse is subtle and difficult to distinguish, while at 0.5 there is a significant effect where distinction becomes easy to determine, and at 0.8 there is a major effect where distinction is grossly perceptible. He also suggests adding an additional threshold at 1.1 to indicate when a visual impact would be very large “and likely to be controversial” (Stamps 2000, page 163-170).

The WEA identifies three levels of impact: not adverse, adverse and unreasonably adverse. Though evaluation criteria are identified, it does not specify thresholds for these criteria. In Table 1 I have proposed effect size thresholds for the WEA these impact levels. This proposal is based on my reading of the literature and experience with the intercept studies conducted to date. However, it is presented for discussion purposes as we gain further experience with evaluating the impact of grid-scale wind development on scenic value and the use of SRSNS.

**Table 2. Proposed Effect Size Thresholds for Wing Energy Act Impact Levels**

<b>Effect Size</b>	<b>Description</b>	<b>WEA impact levels</b>
0.00 or higher		Positive
0.00 to -0.19	Not noticeable, Trivial	Not Adverse
-0.20 to -0.49	Small, Noticeable, Subtle	
-0.50 to -0.79	Medium, Significant	Adverse
-0.80 to -1.09	Large, Major, Grossly perceptible	
-1.1 or lower	Very large, Controversial	Unreasonably Adverse

### 3. Change in Scenic Value

Respondents at the Pleasant Lake and Mattawamkeag Lake boat launches evaluated large panoramic format color prints of an existing view from the center of each lake and the same views as they will appear if the project is constructed. The reliability of these ratings is reported below, as well as the mean ratings, raw impact score, percent change, and effect size.

#### 3.1 Reliability of Scenic Value Ratings

The reliability coefficients in Table 3 indicate that within each respondent group and for each viewpoint, the respondents were collectively in very high agreement about the scenic value ratings. We can be very confident in the ratings from both of the respondent groups.

**Table 3. Reliability for Scenic Value Ratings of Photosimulations**

Interview site:	Photosimulation Viewpoints	
	Pleasant Lake	Mattawamkeag Lake
Pleasant Lake	0.949	0.953
Mattawamkeag Lake	0.936	0.949

Note: The number of respondents at Pleasant Lake is 40; at Mattawamkeag Lake it is 20. Existing and proposed views were rated for both viewpoints.

#### 3.2 Percent Change

One way to normalize the explanation of scenic impact is to describe it as the percent change from the scenic value of the existing condition. The percent changes reported in Table 4 are for both viewpoints as rated by respondents at the Pleasant Lake and Mattawamkeag Lake boat launches. These range from a 31 to 46 percent decrease in scenic value if the project is built. While these seem quite large, there are no standards to decide when a change crosses the threshold to be adverse or unreasonably adverse.

**Table 4. Percent Change for Scenic Impacts**

Location	Viewpoint	n People	Pre- $\bar{x}$ SV	Post- $\bar{x}$ SV	Impact	% Change
Pleasant L	Pleasant L	40	6.375	4.700	-1.675	-31.2
Pleasant L	Mattawamkeag L.	40	6.300	4.425	-1.875	-35.4
Mattawamkeag L.	Pleasant L	20	6.650	4.400	-2.250	-39.8
Mattawamkeag L.	Mattawamkeag L.	20	6.650	4.050	-2.600	-46.0

Note: Ratings range between 1 = Lowest scenic value and 7 = Highest scenic value.

#### 3.3 Effect Size

Another way to normalize the explanation of scenic impacts is to describe it as the standardized mean difference between the scenic value of the view with the project minus the scenic value of the view without the project divided by the pooled standard deviation of the scenic value ratings.

This metric is the effect size described above in the methods section. One advantage to using effect size is that there are threshold guidelines for interpreting what importance to give a particular scenic impact (Cohen 1988, Stamps 2000). The effect sizes reported in Table 5 indicate that the respondents at the Pleasant Lake boat launch considered the change at both lakes to be large and a major impact. The respondents at the Mattawamkeag Lake boat launch considered the change at both lakes to be very large and likely a controversial impact.

**Table 5. Effect Size for Scenic Impacts**

Location	Viewpoint	n People	Pre- $\bar{x}$ SV	Post- $\bar{x}$ SV	Pooled SD	ES
Pleasant L.	Pleasant L.	40	6.375	4.700	1.826	-1.027
Pleasant L.	Mattawamkeag L.	40	6.300	4.425	1.694	-0.989
Mattawamkeag L.	Pleasant L.	20	6.650	4.400	1.846	-1.408
Mattawamkeag L.	Mattawamkeag L.	20	6.650	4.050	1.787	-1.259

Note: Ratings range between 1 = Lowest scenic value and 7 = Highest scenic value.

**Review comments.** The methods used to measure the perception of scenic impact are well established and the use of effect size provides a way to interpret the measurement of change in scenic value that is widely accepted throughout the social sciences. The reliability of these ratings is very strong, and there is no reason to question the validity of the photosimulations used in this study. To the extent that there is any weakness it concerns the representativeness of the survey respondents. This issue is discussed in the next section on public use of SRSNSs.

#### 4. Public Use of SRSNSs

The WEA requires that “the extent, nature and duration of potentially affected public uses of the SRSNSs” be considered as a criterion when evaluating the scenic impact of wind energy development.

##### 4.1 Extent of Use

Accurate values for the use of most SRSNSs in Maine are not available. As a result, the permitting agency is left searching for the best estimates of use that they can find. Often these estimates are simply judgments that the use is “high” or “low” based on the observed conditions during a visit of an hour or less. Intercept surveys provide somewhat better information, though it is still very limited for the purposes of estimating extent of use.

Over a six day period, 176 people were observed at the Pleasant Lake public boat launch; 95 people were observed at the Mattawamkeag Lake boat launch. These observations were made for the equivalent of a six day period,<sup>5</sup> with an average of 29 people per day at Pleasant Lake and 16 per day at Mattawamkeag Lake. Table 6 provides very rough estimates of the extent of use for these lakes if one assumes these six days were representative of visitation during the full year, or the activity season.

**Table 6. Very Rough Estimates of the Extent of Use**

	Pleasant Lake	Mattawamkeag Lake
<b>Observed people</b>	176	95
<b>People per day</b>	29.3	15.8
<b>364 day year</b>	10,677	5,763
<b>220 day season</b>	6,453	3,483

However, for a number of reasons these figures must be considered very rough estimates of use. For instance, they include only weekend days, which likely have higher use, and though it includes Labor Day weekend, they are at the end of the summer season. In addition they only include people who accessed these lakes from the public boat launches, thus users who access the lakes from private docks may be excluded. For instance, The Birches on Pleasant Lake is a lodge that rents RV sites and cabins, also has its own dock and rents boats, canoes and kayaks.

One way to evaluate whether a lake is heavily or lightly used is provided by the Water Recreation Opportunity Spectrum (WROS). The first step is to identify the character of the lake—Pleasant and Mattawamkeag Lakes have characteristics of both the Rural Developed and Rural Natural character types. The WROS identifies the boating carrying capacity for Rural Developed lakes to be 20 to 50 acres per boat; for Rural Natural it is 50 to 110 acres per boat (Hass et al. 2004, page 94). Table 7 shows that the maximum number of water craft observed at one time on Pleasant Lake was 8; on Upper Mattawamkeag Lake it was 6. Based on these maximums, there are 229 acres per boat for Pleasant Lake, and 125 acres for Upper Mattawamkeag Lake. These figures indicate that the level of use for both lakes is lower than anticipated for Rural Developed or Rural Natural areas.

<sup>5</sup> The survey was conducted over two weekends, noon Friday through noon Monday.

Low  
use

**Table 7. Very Rough Estimates of Boating Carrying Capacity**

	Pleasant Lake	Upper Mattawamkeag Lake
Maximum boats at one time	8	6
Size in acres	1,832	752
Acre per boats at one time	229	125

Note: Upper Mattawamkeag Lake is approximately 752 acres; Lower Mattawamkeag Lake is approximately 2539 acres.

**Review comments.** While this approach is useful as one way to understand the extent of use, there are reasons to consider these as very rough estimates. First of all, there could be boats on either lake that were not seen by the interviewers. In addition, these weekends are late in the summer season and the number of boats may be substantially less than at the height of the season. Nonetheless, these figures do support the general feeling that these lakes do not have high use.

#### **4.2 Nature of Use**

Intercept surveys can be an efficient way to investigate the nature of use of a SRSNS. Respondents were asked what activities they planned for the day, and which of these was the primary activity? Table 8 lists the percent of respondents engaging in water-based activities and other activities, as well as the day's primary activity. Vacationing or visiting with friends or family was the most commonly mentioned "Other" activity, so it was added to the list.

All of the Mattawamkeag Lake respondents participated in some sort of water-based activity; most in more than one. Fishing from a boat or shore is the most popular primary activity, though many people also saw their primary activity as staying at their camp or lodge.

A third of the Pleasant Lake respondents did not intend to engage in a water-based activity on the day of the survey. Among the rest of the respondents, all but use of personal water craft seemed to be popular activities. However, water-based activities were relatively unimportant as the primary activity for the Pleasant Lake respondents; most anticipated staying at camp or being with friends and family as the day's primary activity.

Viewing the scenery the most commonly identified activity, though it is rarely mentioned as the day's primary activity. Staying at their camp or lodge was also mentioned by a large proportion of respondents at both lakes. Many Pleasant Lake respondents also identified picnicking, beach going, and being with family or friends as activities for the day. Respondents at Pleasant Lake engaged in a greater diversity of activities, and seemed to place more emphasis on land-based activities. In contrast, the Mattawamkeag Lake respondents planned to engage mostly in water-based activities, focusing on fishing.

Table 8. Percent of Respondents Engaging in Activities, and their Primary Activity

Activity	Pleasant Lake boat launch		Mattawamkeag Lake boat launch	
	Engage in	Primary	Engage in	Primary
<b>Water-based activities</b>				
Fishing from a boat or shore	57.5	5.0	45.0	45.0
Canoeing/Kayaking	42.5	7.5	12.5	--
Boating (Motor Boat)	42.5	--	45.0	--
Swimming	37.5	--	15.0	--
Personal watercraft	7.5	--	7.5	--
<b>Other Activities</b>				
View the scenery	70.0	2.5	45.0	--
Staying at a camp	62.5	42.5	22.5	35.0
Picnicking	47.5	--	17.5	--
Beach going, use of beach	37.5	--	10.0	--
Other: Being with family or friends	27.5	27.5	--	--
Nature Study	20.0	--	10.0	5.0
Staying at a lodge	15.0	2.5	5.0	10.0

Note: The number of respondents at Pleasant Lake is 40; at Mattawamkeag Lake it is 20.

**Review comments.** Identifying the nature of use is one of the strengths of an intercept study. However, there are potential concerns with its application to Pleasant Lake and Mattawamkeag Lake. First, there are access points that were not surveyed, primarily private docks. The survey may not be representative to the extent that users of these private access points have different expectations, enjoyment, and scenic values. Second, the survey was conducted at the end of the summer season. It is possible that the mix of activities will be different during the height of the summer season, but it is certain that it is different during the winter. To the extent that the thoughts of winter users will be different than late summer users, the survey may not be representative. Nonetheless, this survey has captured a significant number of responses from users of these lakes.

#### 4.3 Duration of Use

Respondents were asked "how long they expected to stay out on the lake today?" The mean for Pleasant Lake is 7.5 hours;<sup>6</sup> for Mattawamkeag Lake it is 2.4 hours. They were also asked how many days they visited each lake during the past year. As shown in Table 1, only 20 percent of respondents interviewed at Pleasant Lake had visited Mattawamkeag Lake during the past year; 45 percent of those interviewed at Mattawamkeag Lake had visited Pleasant Lake. The mean number of days respondents visited these lakes is shown in Table 10.

<sup>6</sup> This value seems to be inflated from a misunderstanding of the question by some respondents who indicated that they were spending 24 or more hours on the lake that day. It is likely that this number reflects the time spent at their camp/lodge rather than on the lake. It is unclear why this response was recorded by the interviewer.

**Table 9. Percent of Respondents Visiting Pleasant and Mattawamkeag Lakes in the Past Year**

Interview Location:	Scenic Resource	
	Pleasant Lake	Mattawamkeag Lake
Pleasant Lake boat launch	100	45
Mattawamkeag Lake boat launch	20	100

Note: The number of respondents at Pleasant Lake is 40; at Mattawamkeag Lake it is 20.

**Table 10. Mean Number of Visits by Respondents to Pleasant and Mattawamkeag Lakes in the Past Year**

Interview Location:	Scenic Resource	
	Pleasant Lake	Mattawamkeag Lake
Pleasant Lake boat launch	17.5	4.4
Mattawamkeag Lake boat launch	3.0	23.7

Note: The number of respondents at Pleasant Lake is 40; at Mattawamkeag Lake it is 20. The lowest possible response is "none" and the highest possible response is "97 or more days."

These respondents were also asked whether they "use or visit the lake at night for star gazing, fishing, boating, canoeing, kayaking, or other uses?" A third of the Pleasant Lake respondents use the lake at night; 44 percent of the Mattawamkeag Lake respondents ( $N = 16$ ) use the lake at night. Over all respondents, 19 specified the nature of their use. Of these, 79 percent indicated that they looked at the stars and 32 percent indicated that they went boating or fishing.

These results indicate that the two respondent groups appear to be relatively independent of each other, favoring one lake over the other. The typical Pleasant Lake respondent spends two and a half weeks on the lake, while the typical Mattawamkeag Lake spends three and a half weeks on the lake.

## 5. User Expectations

Respondents were asked about the expected importance of ten attributes to their use of the lake where they were interviewed on the day of their interview. The results are presented in Table 11 for both groups of respondents. Overall, respondents seem to expect all of these attributes to make an important contribution to their day's experience.

**Table 11. The Mean Expected Importance of Attributes to the Day's Experience**

Attribute	Interview Location			
	Pleasant Lake		Mattawamkeag Lake	
	# People	Mean	# People	Mean
Enjoying the outdoors	40	6.90	20	6.95
Enjoying time with family/friends	40	6.75	20	7.00
Relaxing/unwinding	40	6.58	20	7.00
Scenery and scenic views	40	6.50	20	6.70
Getting back to nature	40	6.18	20	6.75
General experience of being out on the water	37	6.08	20	6.80
Enjoy being in a boat	37	5.68	20	6.80
Seeing/observing wildlife	40	5.65	20	5.95
Opportunity to have some time by myself	38	5.63	19	6.20
Quality of the fishing	32	5.59	19	5.85

Note: Ratings range between 1 = Not at all Important and 7 = Extremely Important.

There are three dominant primary activities identified by the respondents: fishing from a boat or shore, staying at a camp or lodge, and being with family or friends. The mean expected importance of attributes to the day's experience for the respondents' primary activity is reported in Table 12. There are only minor differences in the importance of the attributes among these three primary activities; none of them appear statistically significant. This is particularly evident when comparing staying in camp/lodging to being with friends/family, which are highly correlated (Pearson  $r = 0.786$ ). Though still similar, fishing has a slightly different pattern of expected attributes compared to staying in camp/lodge (Pearson  $r = 0.758$ ) and being with family/friends (Pearson  $r = 0.685$ ).

The most important attributes for all three activities are enjoying the outdoors, and time with family and friends. Relaxing and unwinding and getting back to nature are also important to all three activities. However, the importance of scenery and scenic views varies somewhat—it is third most important for respondents whose primary activity for the day is staying in camp or lodge, fifth most important for those whose primary activity is being with family or friends, and seventh most important for those fishing from a boat or shore.

Table 12. The Mean Expected Importance and Rank of Attributes to the Day's Experience for Primary Activities

Attribute	Fishing		Stay in Camp/Lodge		Friends or Family	
	Mean	Rank	Mean	Rank	Mean	Rank
Enjoying the outdoors	6.64	1	6.96	1	7.00	1
Enjoying time with family/friends	6.64	2	6.78	2	7.00	2
Relaxing/unwinding	6.64	3	6.56	4	6.91	3
Enjoy being in a boat	6.64	4	6.11	7	5.44	7
Getting back to nature	6.55	5	6.11	6	6.64	4
General experience of being out on the water	6.45	6	6.44	5	5.44	8
Scenery and scenic views	6.27	7	6.67	3	6.36	5
Opportunity to have some time by myself	6.00	8	5.56	10	5.11	9
Quality of the fishing	5.64	9	5.81	8	4.71	10
Seeing/observing wildlife	5.45	10	5.59	9	5.55	6

Note: Fishing from a boat or shore N = 11. Staying in camp or lodge N = 27. Being with family or friends N = 11. Ratings range between 1 = Not at all Important and 7 = Extremely Important.

These results suggest the most important expectations for users of Pleasant and Mattawamkeag Lakes are to enjoy the outdoors, be with family and friends, and have time to relax and unwind. However, respondents indicated that all of the attributes investigated here are important, suggesting that user expectations may be complex and multi-faceted. At this time, it does not seem that scenery and scenic views is among the most important attributes to having a high quality experience fishing from a boat or shore, which is the only identified primary activity that occurs within these two SRSNSs.

**Review comments.** The expectations of typical viewers were only weakly investigated in previous intercept surveys. This survey has made a significant attempt to systematically investigate viewer expectations. Respondents were asked to rate their "expectations for the number of people that may also be using the lake" on a scale of uncrowded to crowded, and "expectations for the level of development that you will see along the lake" on a scale of undeveloped to developed. However, these ratings are not tied to any known values, so they are not useful for determining manageable thresholds and have not been analyzed here.

## 6. Effect on Enjoyment

After rating the scenic value of a lake view without and with the proposed wind project, respondents were asked “how your enjoyment of visiting the lake would be affected if you were to see the proposed wind project during their visit today?” The results from respondents at both boat launches for both viewpoints are given in Table 13. In addition, the effect size for the deviation from a neutral rating of four is reported. There is essentially no effect on the enjoyment of respondents at the Pleasant Lake boat launch. However, the respondents at the Mattawamkeag Lake boat launch anticipate a small but noticeable negative effect to their enjoyment when using Mattawamkeag Lake and a medium and significant negative effect at Pleasant Lake if the wind project is developed.<sup>7</sup> A brief exploration of possible explanations of this difference between the two respondent groups did you yield any strong possibilities.

**Table 13. The Mean Effect of the Change in View on Enjoyment of Using Significant Scenic Resources**

Interview Location	Scenic Resource	# People	Mean	SD	ES
Pleasant Lake	Pleasant Lake	40	3.98	1.72	-0.01
Pleasant Lake	Mattawamkeag Lake	40	3.98	1.72	-0.01
Mattawamkeag Lake	Pleasant Lake	20	2.79	1.72	-0.70
Mattawamkeag Lake	Mattawamkeag Lake	20	3.15	1.73	-0.49

Note: Ratings range from 1 = Very negative effect, 7 = Very positive effect, and 4 = would not change your enjoyment at all. The change used to calculate effect size is the deviation from neutral (i.e.,  $x - 4$ ).

<sup>7</sup> An effect size between 0.0 and 0.19 is characterized as a “trivial” and “unnoticeable” effect, between 0.20 and 0.49 it is a “small” and “noticeable” effect, and between 0.50 and 0.79 the effect is characterized as “medium” and “significant.” (Cohen 1988, Stamps 2000)

## 7. Effect on Continued Use

Respondents at each boat launch were also asked “how would the proposed wind project affect your use of [each SRSNS] for [each of five] water activities?” Table 14 reports the mean ratings and effect sizes for these five activities, as well as the overall average across the activities in which each person engaged.

These results indicate that the respondents at the Pleasant Lake boat launch do not expect to notice any effect on the likelihood that they will continue to use either lake for these five water-based activities.

On the other hand, the respondents at the Mattawamkeag Lake boat launch anticipate that the presence of the wind project will have a small noticeable effect on the likelihood that they will return to use Mattawamkeag Lake for fishing, ice fishing, and swimming, and to Pleasant Lake for boating, canoeing, fishing or swimming. The negative effect is more significant for these respondents boating on Pleasant Lake, and boating or canoeing on Mattawamkeag Lake. For the Mattawamkeag Lake respondents, a medium or significant negative overall effect is expected for their continued use of both lakes.<sup>8</sup>

It is a bit unexpected that the Mattawamkeag Lake respondents indicated they would be less likely less to continue using these lakes than the Pleasant Lake respondents, since Mattawamkeag Lake is over twice as far from the closest turbines. A brief exploration of possible explanations of this difference between the two respondent groups did you yield any strong possibilities.

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<sup>8</sup> An effect size between 0.20 and 0.49 it is a “small” and “noticeable” effect, while between 0.50 and 0.79 it is a “medium” and “significant” effect. (Cohen 1988, Stamps 2000)

**Table 14. The Mean Effect of the Change in View on Continued Use of Significant Scenic Resources for Specific Water-based Activities**

Interview Location	Scenic Resource	Activity	# People	Mean	SD	ES
Pleasant Lake	Pleasant Lake	Boating	40	4.00	1.59	0.00
Pleasant Lake	Pleasant Lake	Canoe/Kayak	40	4.00	1.59	0.00
Pleasant Lake	Pleasant Lake	Fishing	40	4.00	1.59	0.00
Pleasant Lake	Pleasant Lake	Ice fishing	31	4.13	1.57	0.08
Pleasant Lake	Pleasant Lake	Swimming	40	4.13	1.54	0.08
		<b>Overall Average</b>	<b>40</b>	<b>5.54</b>	<b>2.34</b>	<b>0.02</b>
Pleasant Lake	Mattawamkeag L.	Boating	40	3.98	1.59	-0.02
Pleasant Lake	Mattawamkeag L.	Canoe/Kayak	40	3.98	1.59	-0.02
Pleasant Lake	Mattawamkeag L.	Fishing	40	3.98	1.59	-0.02
Pleasant Lake	Mattawamkeag L.	Ice fishing	31	4.03	1.62	0.02
Pleasant Lake	Mattawamkeag L.	Swimming	40	4.05	1.57	0.03
		<b>Overall Average</b>	<b>40</b>	<b>5.52</b>	<b>2.35</b>	<b>0.01</b>
Mattawamkeag L.	Pleasant Lake	Boating	20	3.25	1.33	-0.56
Mattawamkeag L.	Pleasant Lake	Canoe/Kayak	20	3.25	1.33	-0.21
Mattawamkeag L.	Pleasant Lake	Fishing	19	3.53	1.12	-0.13
Mattawamkeag L.	Pleasant Lake	Ice fishing	16	3.63	1.03	-0.37
Mattawamkeag L.	Pleasant Lake	Swimming	17	3.47	1.18	-0.45
		<b>Overall Average</b>	<b>20</b>	<b>4.53</b>	<b>1.77</b>	<b>-0.55</b>
Mattawamkeag L.	Mattawamkeag L.	Boating	20	3.30	1.26	-0.56
Mattawamkeag L.	Mattawamkeag L.	Canoe/Kayak	19	3.37	1.26	-0.50
Mattawamkeag L.	Mattawamkeag L.	Fishing	20	3.50	1.106	-0.46
Mattawamkeag L.	Mattawamkeag L.	Ice fishing	16	3.63	1.03	-0.37
Mattawamkeag L.	Mattawamkeag L.	Swimming	18	3.50	1.15	-0.44
		<b>Overall Average</b>	<b>20</b>	<b>4.53</b>	<b>1.77</b>	<b>-0.55</b>

Note: Ratings range from 1 = Less likely to return, 7 = More likely to return, and 4 = would have no effect on your return. The change used to calculate effect size is the deviation from neutral (i.e.,  $x - 4$ ).

## 8. Summary and Conclusions

An intercept survey was conducted over two long weekends in late summer at the public boat launches on Pleasant and Mattawamkeag Lakes. Photosimulations of a “worst case” view on each lake with and without the proposed project were evaluated. The Pleasant Lake photosimulation shows parts of 25 turbines from as close as 2.2 miles; the Mattawamkeag Lake photosimulation shows parts of 31 turbines from as close as 4.4 miles. The methods used for the intercept survey follow the generally accepted practices used by recreation and landscape perception researchers. Responses to the survey were obtained from 60 of the approximately 187 adults observed at the two boat launches. With some additional analysis, these data can make a useful contribution toward addressing several of the WEA scenic impact evaluation criteria.

### 8.1 Summary of Findings

**Change in the Scenic Value of Views.** Scenic value is not an explicitly evaluation criterion in the WEA; however it is mentioned as part of several of the evaluation criteria.

Scenic value is represented by a single viewpoint on each of the two lakes. Each viewpoint generally represents a “worst case” condition, with many turbines visible. From most areas on each lake fewer or no turbines will be visible. Respondents rated the scenic value of the existing view and the view with the proposed project; scenic impact is the difference between these two ratings.

The proposed project will result in a decrease in scenic value of between 31 and 40 percent at the Pleasant Lake “worst case” viewpoint, and between 35 and 46 percent at the Mattawamkeag Lake “worst case” viewpoint. While this level of might seem high, there are no guidelines identifying the threshold where percent change becomes adverse or unreasonably adverse.

Effect size is introduced as a scale independent metric that is widely accepted in social science research. The effect size for the scenic impact at the Pleasant Lake “worst case” viewpoint is between -1.03 and -1.41; at the Mattawamkeag Lake “worst case” viewpoint it is between -0.99 and -1.26. Cohen (1988) describes an effect size of 0.8 as being a “large” and “grossly perceptible” difference. Stamps (2000) would agree that an effect size of 0.8 would represent a “major” impact, but also adds a threshold at -1.1 to indicate a very large scenic impact that will likely be controversial.

Based on these results the proposed Oakfield Wind project will have a large to very large scenic impact from the “worst case” viewpoints on Pleasant Lake and Mattawamkeag Lake. The scenic impact at less than “worst case” viewpoints is unknown.

**Extent of Uses.** While conducting the intercept survey, the interviewers systematically counted the number of watercraft they observed. The most they observed at one time were 8 on Pleasant Lake and 6 on Upper Mattawamkeag Lake, or approximately 229 acres and 125 acres per boat respectively. This level of use is well below the normal threshold for Rural Developed or Rural Natural lakes (Hass et al. 2004).

**Nature of Uses.** Respondents were asked about their planned activities for the day, and which of those was their primary activity. All of the Mattawamkeag Lake respondents and two-thirds of the Pleasant Lake respondents planned to engage in a water-based activity. The primary activities of the Mattawamkeag Lake respondents were fishing (45%) and staying at camp or a lodge (40%). The primary activities of the Pleasant Lake respondents were staying at camp or a lodge (45%) and being with family or friends (28%). A large proportion of respondents intended to view scenery during the day, but it was not a primary activity for any respondent.

**Duration of Uses.** On the day of the interview, respondents at the Mattawamkeag Lake boat launch intended to spend an average of 2.4 hours on the lake; respondents at Pleasant Lake boat launch intended to spend 7.5 hours on the lake (though this value appears to be an inflated because of a misunderstanding of the question by some respondents).

During the past year, respondents at the Pleasant Lake boat launch visited Pleasant Lake an average of 17.5 times and Mattawamkeag Lake 4.4 times. Respondents at the Mattawamkeag Lake boat launch visited Mattawamkeag Lake an average of 23.7 times and Pleasant Lake 3.0 times.

**Expectations of Typical Viewers.** The survey asked respondents about their expectations for their day's activities on the lake. The results indicate that all of the activity attributes were important, but the most important included enjoying the outdoors, enjoying time with family/friends, and relaxing/unwinding. Scenic value is a very important attribute for respondents whose primary activity is staying in camp or a lodge, but less important for respondents whose primary activity is fishing (i.e., who are using the SRSNSs).

**Effect on Enjoyment of Users.** Respondents were asked how they thought their "enjoyment of visiting the lake would be affected" by the visible changes shown in the photosimulations. The respondents at the Pleasant Lake boat launch thought the change would have a trivial effect on their experience. However, the respondents at the Mattawamkeag Lake boat launch thought that the change would have a medium or significant effect.

**Continued Use.** Respondents were asked how they thought their continued use of each lake for five water-based activities would be effected by the visible changes shown in the photosimulations—would they be less or more likely to return? Again, the respondents at the Pleasant Lake boat launch thought the change would have a trivial effect on their continued use of either lake. However, the respondents at the Mattawamkeag Lake boat launch thought that there would be a significant or medium negative effect on their continuing to boat on either lake, and canoe/kayak on Mattawamkeag Lake. The thought that the effect of their continuing to fish, ice fish, swim on both lakes and canoe/kayak on Pleasant Lake would have a small but noticeable negative effect.

## 8.2 Conclusions

The scenic impact of the Oakfield Wind project from a "worst case" viewpoint on Pleasant Lake and Mattawamkeag Lake will be very large and can be expected to be controversial. It is important to realize that while the "worst case" viewing conditions are not limited to a very

restricted area, most of the lake will have less visibility of the project and a significant area will have no visibility at all.

The respondents at the Pleasant Lake boat launch think this scenic impact will have little or no effect on the enjoyment or continued use of either lake. On the other hand, the respondents at the Mattawamkeag Lake boat launch think there will be a medium or significant effect on their enjoyment. Fishing and boating are the most common activities of these respondents and they think that the visual change will have a small but noticeable negative effect on their continued fishing of these lakes, and a medium or significant effect on their continued use of these lakes for boating.

Based on these evaluation criteria it seems clear that for the respondents at the Pleasant Lake boat launch the Oakfield Wind project may not even have a noticeable effect on the enjoyment of activities on and continued use of these lakes. The situation is much less obvious for respondents at the Mattawamkeag Lake boat launch. The effect on their enjoyment will reach the level of an adverse impact, but is unlikely to be considered unreasonably adverse. It also appears that the effect on the continued use of these lakes for fishing will only be adverse. However, while the effect on boating, another very common water-based activity for these respondents, will be somewhat greater it also does not appear to reach a level that would be considered unreasonably adverse.

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